

#### ABSTRACT OF THE DISCLOSURE

Methods and apparatus for achieving a compound ultrasound imaging mode are disclosed. The methods include a step of firing a plurality of ultrasound beams at a single location, receiving first and second echoes, and combining the first and second echoes to form a composite scan line. The following beam parameters may be varied: transmission focus depth, transmission aperture, transmission frequency, and transmission burst length. Echoes may vary in one or both of receive bandwidth and receive center frequency. In one embodiment, transmission focus depth, transmission aperture, and receive center frequency all differ between the beams. A weighting step may be performed before or after the summing step.

The apparatus may include vector memory, a compound logic processor for weighting and summing the vectors, and memory for storing the summed vectors.